1-1-2010

Dose of omega-3 PUFA required to lower plasma triglycerides in pre-menopausal women

Cassandra Sparkes
University of Wollongong, cs76@uow.edu.au

Andrew Sinclair
Deakin University

Robert Gibson
University of Adelaide

Paul Else
University of Wollongong, pelse@uow.edu.au

Barbara Meyer
University of Wollongong, bmeyer@uow.edu.au

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Abstract

Outcomes: There was a direct relationship between the supplemental dose of LC w-3 PUFA and subsequent changes in erythrocyte EPA + DHA levels (R2 = 0.64, p

Keywords

pre, 3, menopausal, omega, plasma, lower, required, dose, triglycerides, women, pufa

Disciplines

Arts and Humanities | Life Sciences | Medicine and Health Sciences | Social and Behavioral Sciences

Publication Details

Sparkes, C., Sinclair, A., Gibson, R., Else, P. & Meyer, B. (2010). Dose of omega-3 PUFA required to lower plasma triglycerides in pre-menopausal women. In Conference Abstracts Nutrition Society of Australia and Nutrition Society of New Zealand, 2009, Newcastle, Australia. Australasian Medical Journal, 1 (1), 62-62.

Differential effects of a single oral dose of EPA or DHA rich fish oil on platelet aggregation in healthy human subjects

M Phang[1,4], AJ Sinclair,[2] LF Lincz,[3] ML Garg[1,4]

[1]Nutraceuticals Research Group, School of Biomedical Sciences & Pharmacy University of Newcastle,
[2] School of Exercise & Nutrition Sciences Deakin University,
[3]Hunter Haematology Research Group Newcastle Mater Misericordiae Hospital,
[4]Hunter Medical Research Institute

Background
Increased platelet aggregation is the major cause of heart attacks, stroke and deep vein thrombosis. Long chain omega-3 fatty polyunsaturated acids (LC n-3 PUFA; eicosapentaenoic acid, EPA; docosahexaenoic acid, DHA) are known to reduce platelet aggregation; however studies in the published literature involving EPA and/or DHA supplementation have yielded equivocal results. Recent *in vitro* studies have demonstrated that inhibition of platelet aggregation by LC n-3 PUFA is gender specific.

Objective
The objective of this study was to examine effects of dietary supplementation with a single dose of EPA or DHA rich oils on platelet aggregation (ex-vivo) in male versus female subjects over a 24 hour period.

Design
A placebo controlled trial was conducted in a total of 90 healthy male and female adults (males *n* = 45; females *n*= 45). Platelet aggregation was measured at baseline and 2, 5 and 24 hours post supplementation with either a placebo (olive oil) or EPA or DHA rich oil. The relationship between LC n-3 PUFA and platelet activity at each time point was examined according to gender vs. treatment.

Outcomes
EPA was significantly and progressively most effective in reducing platelet aggregation at 2, 5 and 24 hours post supplementation (-3.6%, -8.8%, -13.3 %, respectively). DHA was equally effective at 24 hours post supplementation (-11.9%). When grouped by gender, males showed a greater reduction in platelet aggregation at 2, 5 and 24 hours following EPA supplementation (-11%, -10.6%, -20.5%) compared with placebo, whereas DHA was not significantly effective. In contrast, DHA was significantly most effective in reducing platelet aggregation at 24 hours (-13.7%) in females while EPA was not effective compared with placebo.

Conclusion
Significant gender differences exist to reduce platelet aggregation in response to EPA or DHA. Males benefit more from EPA supplementation while in females, the platelets are more responsive to DHA.

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CE Sparkes[1], AJ Sinclair[2], RA Gibson[3], PL Else[1], BJ Meyer[1]

[1]School of Health Sciences, Smart Foods Centre and Metabolic Research Centre, University of Wollongong , NSW,
[2]School of Exercise and Nutrition Sciences, Deakin University, VIC,
[3]School of Agriculture, Food and Wine, University of Adelaide, SA

Background
The hypotriglyceridemic effects of long chain (LC) ω-3 PUFA are well established for men and post-menopausal women; however the benefits for young women are unknown.

Objective
We aimed to determine the effective dose of LC ω-3 PUFA for lowering plasma triglycerides (TG) in pre-menopausal women through a dose-response intervention with low doses of fish oil.

Design
A randomized, double-blind, placebo-controlled trial of 8 weeks duration was conducted in 29 women, using 0, 0.35, 0.7 or 1.0 g/day LC ω-3 PUFA from DHA-rich tuna oil and/or placebo capsules. Fasting plasma TG and erythrocyte LC ω-3 levels were determined using enzymatic colorimetry, and direct transesterification followed by gas chromatography respectively.

Outcomes
There was a direct relationship between the supplemental dose of LC ω-3 PUFA and subsequent changes in erythrocyte EPA + DHA levels (R^2 = 0.64, $p<0.0001$). A weaker relationship was observed between changes in erythrocyte LC ω-3 PUFA and those in plasma TG levels (R^2 = 0.15, $p<0.05$). Erythrocyte EPA + DHA levels rose from a mean baseline level of 4.9±0.2% to 5.0±0.4%, 5.4±0.3%, 6.9±0.2% and 7.4±0.4% after supplementation with 0, 0.35, 0.7 and 1.0 g/day LC ω-3 PUFA respectively. Similarly plasma TG levels were unchanged from a mean baseline level of 1.1±0.1 mmol/L after 0 and 0.35 g/day, but decreased to 0.8±0.1 mmol/L after supplementation with 0.7 or 1.0 g/day LC ω-3 PUFA. Both the TG-lowering effect and incorporation of EPA and DHA into RBC appeared to plateau between 0.7 and 1.0g/day LC ω-3 PUFA.

Conclusion
This study suggests that 0.7g/day of LC ω-3 PUFA, but not 0.35g/day, is effective for TG-lowering in pre-menopausal women. Previous studies suggest greater than 1.0 g/day LC ω-3 PUFA is required for TG-lowering of a similar magnitude.